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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/781,706

02/20/2004

Chandra Mouli

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4202

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7590

09/26/2006

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EXAMINER

VU, HUNG K

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 09/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/781,706	<b>Applicant(s)</b> MOULI, CHANDRA	
	<b>Examiner</b> Hung Vu	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2006.
- 2a) ☒ This action is **FINAL**.      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 4,5,12,13,17-19,21,25,35 and 36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,6-11,14-16,20,22-24 and 26-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 8 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Clevenger et al. (US 2004/0227061, of record).

Clevenger et al. discloses, as shown in Figures 1-13, an image sensor comprising:

a substrate (100B) formed over a base layer (100A);

a plurality of pixel cells (104A,104B) formed within the substrate, each pixel cell comprising a photo-conversion device;

a plurality of trenches (116A,116B), each trench being provided along a perimeter of a respective pixel cell, each trench extending to a surface of the base layer, each trench having sidewalls, and being at least partially filled with a material that inhibits electrons from passing through the trench. Note that Figures 8-12 shows the trenches (116A,116B) extends to a surface of the base layer (100A).

Regarding claim 8, Clevenger et al. discloses the trench has a depth greater than about 2000 Angstroms. See section [0036]

Regarding claim 10, Clevenger et al. discloses the sensor comprises a CMOS image sensor.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clevenger et al. (US 2004/0227061, of record)

Clevenger et al. discloses the claimed invention including the sensor as explained in the rejection above. Clevenger et al. does not disclose the depth of the trench in the range of about 4000 to about 5000 Angstroms. Although Clevenger et al. does not teach the depth of the trench, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the trench of Clevenger et al. having a desired depth, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

3. Claims 2, 3, 6, 7, 14-16, 20, 22-24 and 26-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clevenger et al. (US 2004/0227061, of record) in view of Yoshinori (JP 363009968, of record).

Art Unit: 2811

Clevenger et al. discloses the claimed invention including the sensor as explained in the rejection above. Clevenger et al. does not disclose a thermal oxide on the sidewalls of the trench structure, and the first material selected from the group consisting of undoped polysilicon. However, Yoshinori discloses a thermal oxide (26) on the sidewalls of the trench, and the filled material (27) comprising an undoped polysilicon, which is also a conductive. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the trench of Clevenger et al. having the thermal oxide on the sidewall of the trench and the filled material of undoped polysilicon, such as taught by Yoshinori in order to further prevent the electrons from passing through the isolation structure.

Regarding claims 16 and 28, the term “high-density plasma oxide and spin on dielectric oxide” is method recitation in a device claimed. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claims 22-23 and 30-32, Clevenger et al. and Yoshinori disclose the trench has a depth greater than 2000 Angstroms.

Art Unit: 2811

Regarding claims 24 and 32, Clevenger et al. and Yoshinori disclose the semiconductor device comprises a CMOS image sensor.

Regarding claim 26, Clevenger et al. and Yoshinori disclose a processor.

Regarding claims 11 and 33, Clevenger et al. and Yoshinori do not disclose the semiconductor device comprises a CCD image sensor. However, Clevenger et al. and Yoshinori disclose a CCD image sensor has some advantages such as smaller size than the CMOS image sensor. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the device of Clevenger et al. and Yoshinori comprising CCD image sensor in order to reduce the size and to improve the circuit density.

### ***Response to Arguments***

4. Applicant's arguments filed 06/26/06 have been fully considered but they are not persuasive.

It is argued, at page 8 of the Remarks, that Clevenger et al. does not disclose each trench extending to a surface of the base layer. This argument is not convincing because Clevenger et al. discloses, as shown in Figures 8-12, each trench (116A, 116B) extending to a surface of the base layer (100A). Therefore, Applicant's claim 1 does not distinguish over the Clevenger et al. reference. Note that drawings and pictures can be anticipated if they clearly show the structure which is claimed. In re Marz, 173 USPQ 25 (CCPA 1972). When the reference is a utility patent, it does not matter that the feature shown is

Art Unit: 2811

unintended or unexplained in the specification. The drawing must be evaluated for what they reasonably disclose and suggest to one of ordinary skill in the art. In re Aslanian, 200 USPQ 500 (CCPA 1970). See MPEP 2121.04 for more information on prior art drawings as “enabled disclosures.”

### ***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Tuesday to Friday 6:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Eddie C. Lee can be reached on (571) 272 - 1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2811

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vu

September 14, 2006

A handwritten signature in cursive script, appearing to read "Hung Vu", is written over a horizontal line.

Hung Vu

Primary Examiner